MultiModemZBA

Global MT5634ZBA-Series

MT5634ZBA–V.90
MT5634ZBA-V–V.90
MT5634ZBA–V.92
MT5634ZBA-V–V.92

User Guide

MultiTech®
Systems

MultiModemZBA
Global MT5634ZBA-Series User Guide

MT5634ZBA–V.90, MT5634ZBA-V–V.90, MT5634ZBA–V.92, MT5634ZBA-V–V.92

PN S000286A, Version A

Revisions

Revision Level	Date	Description
A	02/12/03	Initial release.

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Patents

This device covered by one or more of the following patents: 6,031,867; 6,012,113; 6,009,082; 5,905,794; 5,864,560; 5,815,567; 5,815,503; 5,812,534; 5,809,068; 5,790,532; 5,764,628; 5,764,627; 5,754,589; 5,724,356; 5,673,268; 5,673,257; 5,644,594; 5,628,030; 5,619,508; 5,617,423; 5,600,649; 5,592,586; 5,577,041; 5,574,725; 5,559,793; 5,546,448; 5,546,395; 5,535,204; 5,500,859; 5,471,470; 5,463,616; 5,453,986; 5,452,289; 5,450,425; D353, 598; 5,355,365; 5,309,562; 5,301,274
Other Patents Pending

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Table of Contents

Chapter 1 - Introduction

Congratulations on your purchase of the MultiModemZBA modem. You have acquired one of the finest intelligent voice/data/fax modems available today from one of the world's oldest modem manufacturers: Multi-Tech Systems, Inc. This user guide will help you to install, configure, test and use your modem.

The Products

MT5634ZBA-V.90	A desktop global data/fax modem supporting the V.90 protocol.
MT5634ZBA-V-V.90	A desktop global data/fax/voice modem supporting the V.90 protocol.
MT5634ZBA-V92	A desktop global data/fax modem supporting the V.92 protocol.
MT5634ZBA-V-V92	A desktop data/fax/voice modem supporting the V.92 protocol.

The Features

- **Global Approval –** With an MT5634ZBA global product, you need just one modem for worldwide use. The MT5634ZBA has approvals in 40+ countries. This means one global product can ship virtually anywhere.

- **Voice –** (With Voice Models) The voice feature supports voice mail and a full-duplex speakerphone. This allows you and the caller to speak and listen at the same time.

- **Remote Configuration –** Whether you provide connectivity for a sales office just miles away or for multiple offices across the world, the MultiModemZBA lets you configure each remote modem from a central site. See Chapter 5 for a complete discussion.

- **Callback Security –** Callback security protects your network from unauthorized access. It also helps control long-distance charges for remote offices and users requiring access to the central site LAN. When callback security is enabled, the remote callers enter a password, and then the central site's modem calls back. See Chapter 6 for a complete discussion.

- **Modem-on-Hold –** Modem-on-Hold works with your telephone company's Call Waiting service to put a remote modem "on hold" while you answer a voice call. When you finish your conversation and hang up, the previous connection resumes, providing you have not exceeded the time limit. Among other things, this feature eliminates the problem of the modem disconnecting if someone calls you while Call Waiting is enabled.

- **2-Wire Leased-Line Support –** A leased line is a private, permanent, telephone connection between two points. Unlike normal dialup connections, a leased line is always active. The modems automatically connect when they are attached to the line and are turned on. Because a leased line is always active, one of the two modems on the line must be configured as the originate modem and the other as the answer modem. It does not matter which is which. In the event of an interruption, leased-line modems automatically reconnect when the data line or power is restored.

Features Table

FEATURES	PRODUCTS			
	MT5634 ZBA V.90	MT5634 ZBA-V V.90	MT5634 ZBA V.92	MT5634 ZBA-V V.92
V.90/56K Max. Data Speed	x	x		
V.92/56K Max. Data Speed			x	x
Modem-on-Hold (V.92 Feature)			x	x
Global Approval in Many Countries for Worldwide Use	x	x	x	x
Voice Support		x		x
Callback Security	x	x	x	x
2-Wire Leased-Line Support	x	x	x	x
DTMF Tone Detection	x	x	x	x
Phone Number Storage for Automatic or DTR Dialing	x	x	x	x
Common Features:				
• V.90 or V.92 Related Features (see below)	x	x	x	x
• Remote Configuration	x	x	x	x
• Error Correction	x	x	x	x
• Caller ID (U.S. Only)	x	x	x	x
• Multi-Language Data/Fax Software for Windows	x	x	x	x
• Windows Plug and Play Operation	x	x	x	x
• Flash Memory for Easy Updates	x	x	x	x
• Self-Resetting Lightning Protection	x	x	x	x
• Ten Year Warranty	x	x	x	x

Features Specific to V.90

- **Speed –** V.90/56K download speeds from V.90 servers and 33.6K upload speeds.

- **Fax –** Class 1 and 2 faxing at 14.4K.

- **Compression –** V.42 compression.

Features Specific to V.92

- **Speed –** V.92/56K download speeds and 48K upload speeds when connecting with V.92 server.

- **Fax –** Class 1, 1.0, 2, and 2.1 faxing at speeds to V.34/33.6K bps (Super G3).

- **Compression –** V.44 compression improves data throughput rates.

- **Quick Connect –** Quick connect can cut the time required for a dial-up modem to "handshake" to an ISP or other connection in half.

- **Modem-on-Hold –** Modem-on-Hold allows the modem to work in conjunction with call waiting provided by the phone company.

Please note that some V.92 features are turned off in the factory default configuration, and may need to be turned on, depending on your needs.

What Is in Your Modem Package

- An MT5634ZBA-Series modem
- A set of four self-adhesive plastic feet
- This Quick Start Guide
- A system CD containing modem drivers, a User Guide, an AT Command Reference Guide, PhoneTools (a data communications program), and Acrobat Reader.
- A universal power supply
- A 9-pin to 25-pin serial cable
- An RJ-11 phone cable
- A power cord (country-specific)

Chapter 2 - Installation

This chapter shows you step-by-step how to set up your Multi-Tech MT5634ZBA modem.

Safety Warnings

- Use this product only with UL- and CUL-listed computers (U.S.A. and Canada)
- To reduce the risk of fire, use only 26 AWG (.41mm) or larger telephone wiring.
- Never install telephone wiring during a lightning storm.
- Never install a telephone jack in a wet location unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone during an electrical storm; there is a risk of electrical shock from lightning.
- Do not use a telephone in the vicinity of a gas leak.

Step 1: Mount the Feet

The modem comes with a set of self-adhesive plastic feet, which you can optionally mount on the modem. To install the feet, simply peel them from their paper strip and press them into the recesses on the bottom of the modem.

Step 2: Change the Internal Jumpers

This step is required only if:

- You intend to use the modem on a leased line.
- You intend to add a monophonic external speaker to your modem with the voice option. No changes are needed for stereo.

This will require you to open the modem and move one or more jumpers on the modem's printed circuit board.

Warning: The following procedure must be performed by authorized service personnel.

Caution: The circuit board can be harmed by static electricity. Before you open the case, touch a grounded object, such as the metal chassis of your computer, to discharge any static electricity in your body, then touch the metal shell of the modem's RS-232 connector to ensure that there is no voltage difference between you and the modem.

Opening the Modem

1. If the modem is connected, turn it off and remove all connecting cables (including the power and line cables).
2. Turn the modem upside down.
3. On the bottom of the modem are two screws, which hold the case together. Remove both screws and set them aside.
4. Turn the modem right side up.
5. Remove the top part of the modem case.
6. To close the modem, reverse Steps 1–5.

Location of the Jumpers

J10 Dial-Up/Leased Line

] Leased line
] **Dial-up (default)**

J11 Originate/Answer

Answer (default)
Originate

J11 ▫▪▪

J10

J8

J8 Speaker Mode   ← *Jumper for Modem with Voice Option*

] **Closed: stereo (default)**
] **Open: mono**
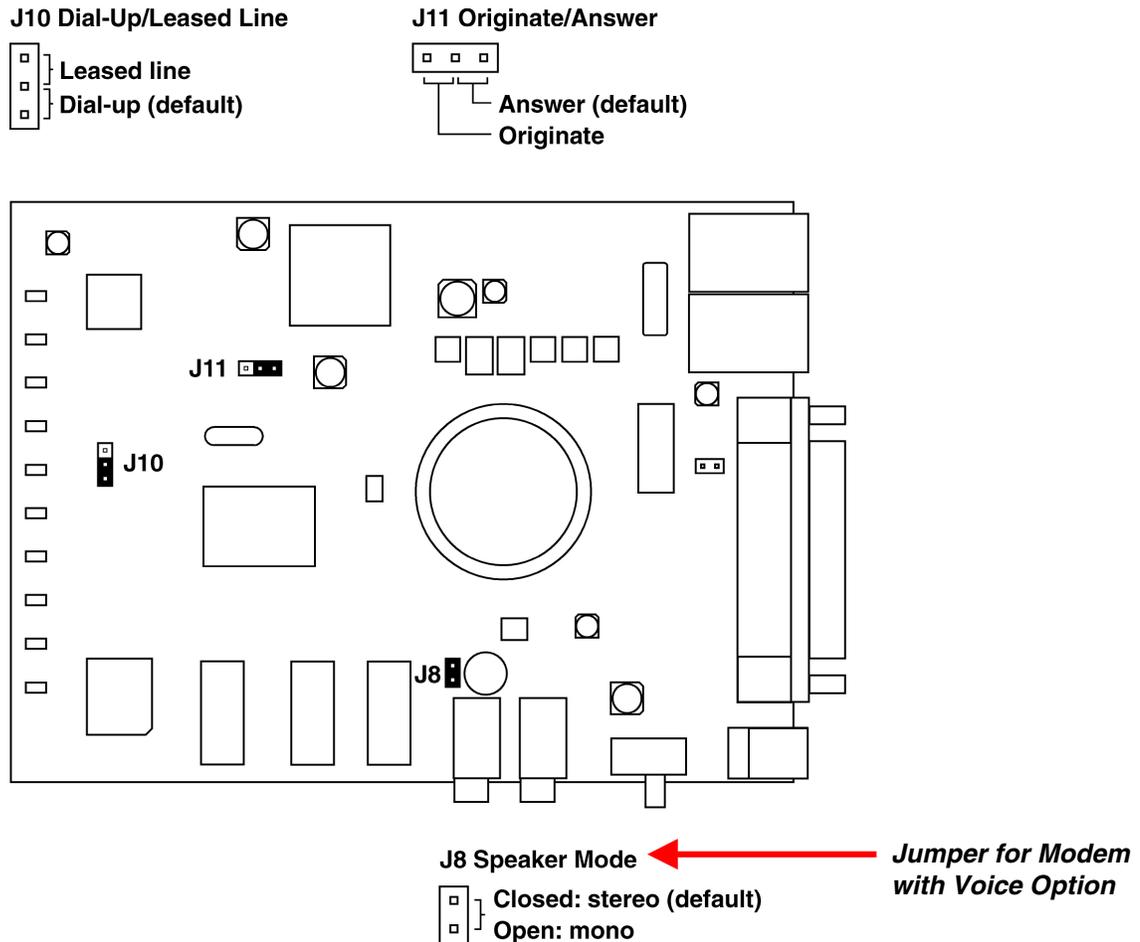
Changing the Dial-Up/Leased-Line Jumper

As shipped from the factory, your modem is configured for normal dial-up operation. That is, the modem must dial a phone number to connect to another modem. To use the modem on a leased line, you must change jumper J10 to select leased line operation, and J11 to select whether it will be the originating or the answering modem. If dial-up operation is selected, J11 has no effect. See Chapter 3 for additional leased line information.

- The factory default is the answer position. This makes the modem the answering modem on the leased line.
- To use the modem on a leased line, move the J10 jumper plug from the default dial-up position to the leased line position.
- To make the modem the originating modem on the leased line, move the J11 jumper plug to the originate position.

Changing the Voice Jumper

The speaker jumper (J8) is next to the external speaker jack.

- The factory default position of the voice jumper is set for a stereo speaker or sound card. A jumper plug covers both pins of the J8 jumper.
- To use the modem with a monophonic external speaker, remove the jumper plug from the J8 jumper pins. You can store it by placing it on one jumper pin.

Step 3: Connect the Modem to Your PC

Turn off your computer. Place the modem in a convenient location, and then connect it to your computer's serial port, the telephone line or leased line, AC power, and, optionally, your telephone.

Connections - No Voice   Connections With Voice
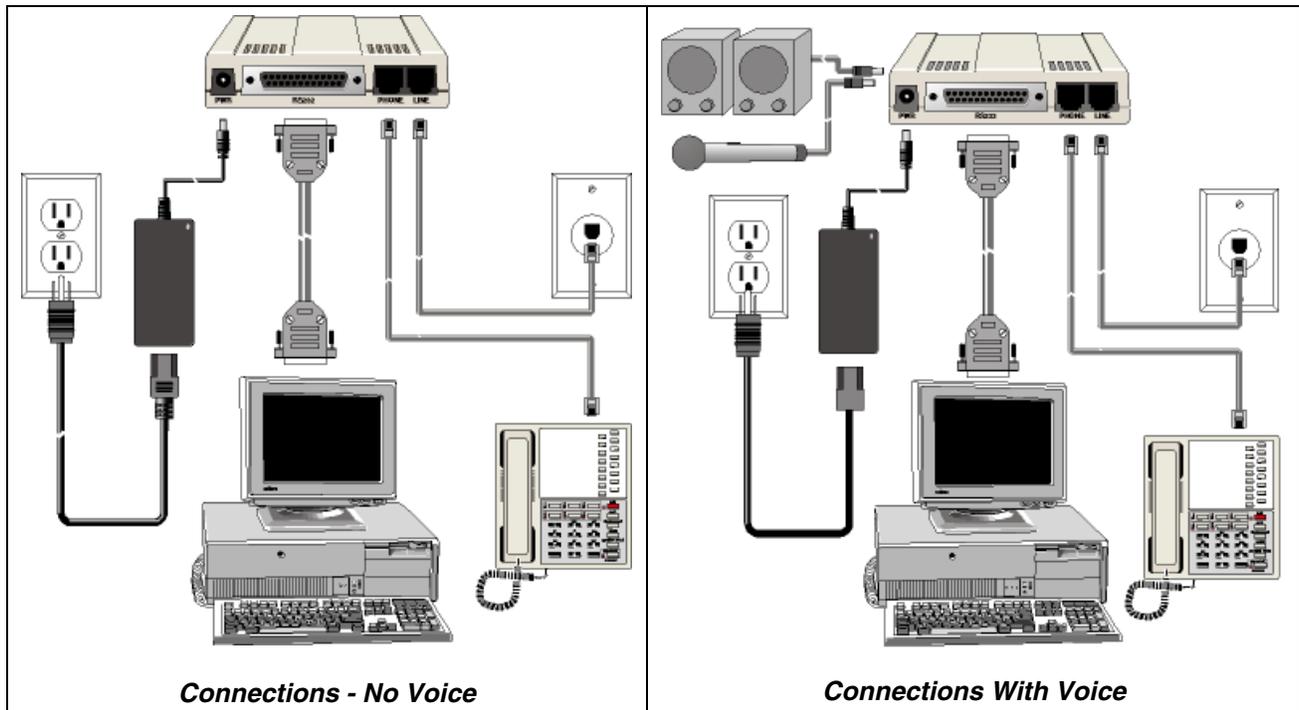
Connect the Modem to Your PC

Plug one end of the serial cable into the RS232 connector on the modem and the other end into a serial port connector on your computer, such as COM1 or COM2.

Connect the Modem to the Telephone Line

Plug one end of the modular telephone cable into the modem's LINE jack and the other end into a standard phone wall jack.

Important: The LINE jack is not interchangeable with the PHONE jack. Do not plug the telephone into the LINE jack or the line cable into the PHONE jack.

Note: Regulatory agencies may impose certain restrictions on equipment connected to public telephone systems. For more information, see Appendix A.

Connect the Two-Wire Leased Line (Leased Line Only)

Plug one end of a two-wire telephone cable into the modem's LINE jack and the other end to a two-wire leased line wall jack or terminals.

Note: Before you can use the modem on a leased line, you must first change the internal jumpers. See "Step 2: Change the Internal Jumpers."

Connect the Modem to a Phone (Optional)

If you want to connect a phone to same line as the modem, plug it into the modem's PHONE jack.

Important: The PHONE jack is not interchangeable with the LINE jack. Do not plug the telephone into the LINE jack or the line cable into the PHONE jack.

Connect a Microphone (Voice Option)

For voice mail or speakerphone applications, plug an unamplified microphone into the MIC jack on the side of the modem. The microphone should have a stereo 1/8-inch mini plug. Do not use a monophonic microphone.

Connect Speakers (Voice Option)

For speakerphone or voice mail applications, use a 1/8-inch plug male-to-male stereo patch cord to connect the SPKR jack on the side of the modem to the LINE IN jack on your sound card. If your sound card does not have a LINE IN jack, use its MIC jack. The stereo male-to-male patch cord can be purchased at a local PC retail store.

If you do not have a sound card, you can plug an unamplified speaker directly into the SPKR jack.

Connect the Modem to the AC Power Outlet

The power switch is located on the right side of the modem. Make sure it is set to OFF. Plug the universal power supply into the PWR jack on the modem. Then plug one end of the country-specific power supply cord into the universal power supply and the other end into a power outlet or power strip.

Note: Use only the power supply supplied with the modem. Use of any other power supply voids the warranty and can damage the modem.

Power-On Test

Test the modem by turning it on. When you turn it on, the modem performs a diagnostic self-test, after which the 56 indicator should light. If this does not happen, check that the power switch is on, the power supply is solidly connected, and the AC outlet is live. If these measures do not work, see Chapter 7, "Troubleshooting."

Surge Protectors and Lightning

Your modem has automatic, self-resetting protection to protect it from lightning-induced electrical spikes on the telephone line. Nonetheless, large power surges and nearby lightning strikes can damage or destroy your modem. Therefore, we recommend that you plug the modem into a surge protector rather than directly into a wall outlet, preferably a surge protector that provides protection against electrical spikes on the telephone line as well as on the power line. Note that not even a surge protector can guard against damage from a nearby lightning strike. During an electrical storm, it is safest to unplug your computer equipment from both the power outlet and the telephone line.

Step 4: Install the Modem Driver

If you use Windows 95 or above, you must install the modem driver. The modem driver tells Windows how to control the modem. If you use a Linux operating system, please see Appendix D. If you use another operating system, please refer to its documentation for modem installation information.

Installing the Modem Driver

1. Make sure your modem is connected properly, and then turn on your computer. Windows should detect your new modem and open the **Install New Modem** wizard.

   Note: If Windows cannot find a modem, your modem may be turned off, it may be plugged into the wrong connector on your computer, or the serial cable may be faulty. See "None of the LEDs Light When the Modem Is Turned On" and "The Modem Does Not Respond to Commands" in Chapter 7, "Troubleshooting."

2. Insert the system CD into your CD-ROM drive, and then click **OK**.

3. Windows installs the modem driver.

4. Click **Finish** to exit.

   For Windows NT, the Install New Modem wizard presents one additional prompt before Step 2. At this prompt, select **Don't detect my modem; I will select it from a list**. Then click **Next**.

   A dialog box with a list of manufacturers and a list of modem models appears. Select your modem. Continue with Step 2 above.

Removing an Old Modem Driver

When a new modem replaces another modem, the old modem driver remains in Windows, and the old modem driver is still selected in Windows applications. Though you can change the application connection descriptions one at a time, it is easier to force Windows applications to use the new modem by removing the old modem driver from Windows.

1. Click the **Start** button, point to **Settings**, and click **Control Panel**.

2. Double-click the Modems icon to open the **Modems Properties** dialog box.

3. In the list box, select the old modem.

4. Click **Remove**, and then click **Close**.

Step 5: Configure the Modem for Your Country

Different countries have different requirements for how modems must function. Therefore, before you use your modem, you must configure it to match the defaults of the country in which you are using it. You must also do this if you move the modem to another country after it has been configured for the first country. You can use one of two configuration methods:

1. Use the Global Wizard to Configure Your Modem
2. Use AT Commands to Configure Your Modem

Using the Global Wizard to Configure Your Modem

The Global Wizard configuration utility is recommended for computers running Windows 95 or newer.

1. Insert the MultiModemZBA system CD into the CD-ROM drive. The **Autorun** menu should appear.
2. Click **Initial Setup and Country Selection**.
3. Choose either:
   Run Global Wizard from CD. This will not load the wizard onto your hard drive, or
   Install Global Wizard on the HD. This will install the wizard onto your hard drive for future use.
4. The Global Wizard dialog box appeared. Click **Next**.
5. The Global Wizard searches for your modem and identifies it. Click **Next**.
6. Select the country in which the modem will be used. Click **Next**.
7. Review your choice of country. If it is correct, click **Next** to configure the modem.
8. When Global Wizard announces that the parameters have been set, click **Finish** to exit.

Using AT Commands to Configure Your Modem

Non-Windows users can configure the modem using AT commands. You must enter these commands in your communication program's terminal window.

1. Run Phone Tools.

2. To configure the modem for a specific country:
   Type **AT%T19,0,***nn*, where *nn* is the country code in hexadecimal notation.
   Click ENTER. The message **OK** displays.

3. Then save the code by typing the following command: **AT&F&W**.
   Click ENTER. The message **OK** displays.

4. To verify that the correct country has been configured, type:
   ATI9 and click ENTER.

   The country code displays:

Country	*AT Command (hexadecimal)*	*Result code (decimal)*
Euro/NAM	AT%T19,0,34 (default)	52

A list of country codes can be found on the Multi-Tech Web site at
http://www.multitech.com/GlobalModem/config.

Step 6: Install Data Communications Software

Data communications software is designed to configure a modem so it can send and receive messages. Your Multi-Tech modem operates under the control of a data communications program, such as Phone Tools, included with the modem. The modem can also operate under other general-purpose data communication programs, such as Windows HyperTerminal. To install Phone Tools, insert the MT5634ZBA system CD into the CD-ROM drive; click the Phone Tools icon. You will be asked to choose your language. The software automatically loads onto your PC. To configure your modem, follow these steps:

1. After installing Phone Tools, run the program.
2. Find the dialog box or menu that lets you select your modem. (In Windows Terminal select **Settings** | **Modem Commands**; in HyperTerminal select **File** | **Properties** | **Phone Number**; and in PhoneTools select **Configure** | **General Configuration** | **Communication** | **Change Modem**.
3. Choose your modem from the program's modem list. If it isn't listed, choose a generic modem and modify the settings as necessary.
4. Change the modem initialization string, if necessary. The factory default configuration works well for most purposes. To load the factory default configuration, use **AT&F**. To load a custom configuration that was saved using the **&W** command, use **ATZ**. For a Macintosh, the initialization string should include the **&D0** command. If you do not want the modem to always answer the phone, add **S0=0** to the string. To use Caller ID with the modem, add **S0=2** to the string (Caller ID information is sent between the first and second rings, so the phone must ring at least twice before the modem picks up the line). Depending on the software, you might have to end the string with a carriage return character (**^M**).
   Note: To change the modem's default configuration, type new commands in the communication program's terminal window, adding the **&W** command to store them in the modem's nonvolatile memory. For instance, to create a default configuration that turns off autoanswer, type **AT&FS0=0&W**. The new configuration loads automatically whenever the modem is turned on or receives the **ATZ** command.
5. Select the port the modem is connected to (normally COM1 or COM2).
6. Select your serial port speed. This can be labeled "maximum speed," "DTE bps," or "baud rate." Ideally, if you use data compression, you should set your serial port baud rate to four times the modem's maximum transmission speed or faster; however, few files can be compressed enough to require speeds that high, and not all serial ports can handle speeds that high.
7. If the communication program has an autobaud selection, make sure it is disabled. Autobaud applies only to older modems, and can cause problems if enabled.
8. If the program allows you to edit the no-connect messages (*NO CARRIER, BUSY, NO ANSWER, NO DIALTONE*), make sure there is no space between *DIAL* and *TONE* in *NO DIALTONE*.
9. For more information, refer to the software manuals or the software's online help for other configuration choices and for information on how to use the modem with other communication programs. In most cases you can accept the default values.

Step 7: Modem-on-Hold

This step applies to modems used in North America and V.92 modems only.

Modem-on-Hold is a feature that allows you to manage all your telephone communications while connected to the Internet over a single telephone line. Load it onto your PC from the system CD.

> **Important:**
> **1.** The modem driver must be installed before you install Modem-on-Hold.
> **2.** Your ISP must support the Modem-on-Hold feature.
> **3.** Your modem must be support V.92.
> **4.** Your phone line must support call waiting.

For information about setting up and using Modem-on-Hold, refer to the Modem-on-Hold ReadMe file. You can also use the program's online Help accessed by pressing F1 or the Help button; you can also right-mouse click on a menu item.

Chapter 3 - Operation

About the Front Panel

The MultiModem V.92 Front Panel
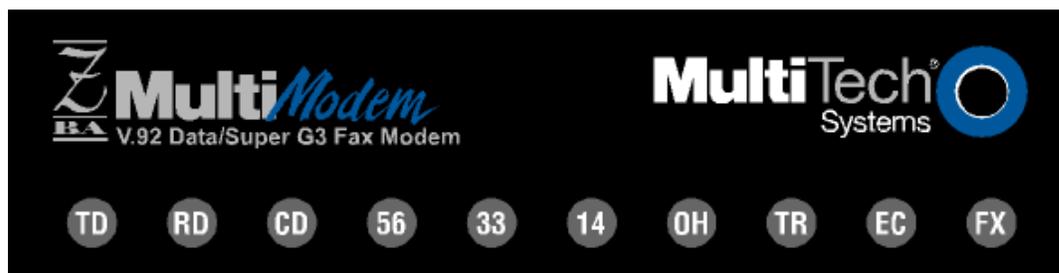
The MultiModem V.90 Front Panel

The MultiModemZBA LED indicators on the front panel indicate status, configuration, and activity:

TD – Transmit Data. Flashes when the modem is transmitting data to another modem.

RD – Receive Data. Flashes when the modem is receiving data.

CD – Carrier Detect. Lights when the modem detects a valid carrier signal from another modem. It is on when the modem is communicating with the other modem, and off when the link is broken.

56 – 56K Mode (56,000–28,000 bps). Lights whenever the modem is set for or connects using the V.90 or V.92 protocol. The actual connection speed depends on ISP server capabilities and line conditions.

33 – V.34 Mode (33,600–16,800 bps). Lights whenever the modem connects using the V.34 protocol.

14 – V.32bis Mode (14,400–12,000 bps). Lights when the modem connects using the V.32bis protocol. The modem can connect at lower than V.32bis speeds, but no speed indicator lights during the connection.

OH – Off-Hook. Lights when the modem is off-hook, which occurs when the modem is dialing, online, or answering a call. Flashes when the modem pulse-dials.

TR – Terminal Ready. Lights when a communications program is using the modem. It means the modem is ready for an outgoing or incoming call. It goes off when the communications program disconnects the serial port. When it goes off, a connected modem will also disconnect.

EC – Error Correction (V.42). Lights continuously when the modem is in V.42 error correction mode, and flashes when compression is activated.

FX – Fax. Lights when the modem is in fax mode.

Note: When you turn on the modem, the protocol indicators flash briefly as the modem does a self-test, after which the **56** indicator lights. After a call, the indicator for the protocol used in the connection remains lit until another call is made or the modem is reset. If you connect at a rate under 14,400 bps, all protocol indicators remain off after the connection is broken, even though the modem is still turned on.

PhoneTools Features

With the PhoneTools communications program included with your modem, you can:

- Upload and download data files.
- Send faxes at preset times.
- Store incoming voice messages and faxes.
- Retrieve stored messages, faxes, and telephone numbers (telephone number retrieval requires Caller ID service from your telephone company).
- Print a received fax.

For detailed information about operating your modem under PhoneTools, please refer to the PhoneTools online documentation.

Leased-Line Operation

The MultiModemZBA modem can be used on a two-wire leased line.

A leased line is a private, permanent telephone connection between two points. Unlike normal dialup connections, a leased line is always active. The modems automatically connect when they are attached to the line and are turned on. Because a leased line is always active, one of the two modems on the line must be configured as the *originate* modem and the other as the *answer* modem; however, it does not matter which is which.

In the event of an interruption, leased-line modems automatically reconnect when the data line or power is restored.

Setup

1. Open the modem and change jumper J10 to select leased-line operation, and jumper J11 to select either originate or answer operation, depending upon how you intend to use the modem. See Chapter for the detailed procedure.
2. Connect a modular telephone cable to the LINE jack. Connect the other end of the cable to a two-wire lease-line jack or terminals supplied by the telephone company.
3. Turn on the modem.

V.92 Operation

Because the V.92 protocol is new and still largely unsupported by central servers, some features are disabled by default in the initial release of the MT5634ZBA modem. This section describes the status of the V.92 features in the initial release. Please note that the V.92 special features require connection to a V.92-capable server.

- **General.** The V.92 protocol is enabled by default. If the MultiModemZBA modem detects another V.92 modem during the handshake phase, they will connect in V.92 mode; otherwise, they will connect in V.90 mode or the highest mutually acceptable mode. The AT command that controls this is **+MS=**.
- **Commands.** AT commands specific to the V.92 protocol and the new V.44 compression protocol begin with the plus character (+). These commands are in this manual. Also, the S109 register has been modified to support V.92.
- **PCM Upstream.** PCM Upstream is disabled by default. To upload files at speeds above 33.6 kbps, you must enable PCM Upstream using the command **+PIG=1**. Please note that this requires connection to a V.92-capable server. Also, please note that since upload speeds are affected by line conditions, meeting the previous requirements cannot guarantee speeds above 33.6 kbps.
- **Quick Connect.** Quick Connect, which shortens the handshake time with another V.92 modem, is disabled by default. To enable it, use the command **+PQC=0**. Quick Connect speeds connect times by skipping the line test during the handshake and using the configuration from the last data connection. Quick Connect works best when line conditions are consistent from call to call. If line conditions are variable, enabling Quick Connect can actually **increase** the connect time slightly.

- **Modem-on-Hold.** Modem-on-Hold enables you to put a V.92-capable server on hold while you take another call. Modem-on-Hold operation is possible only with the   Modem-on-Hold program included with the MT5634ZBA modem.

Connecting to the Internet

Your Multi-Tech modem is your gateway to the Internet and the World Wide Web. To access the Internet and Web via your modem, you must establish a dial-up account with an Internet service provider (ISP). To locate an ISP near you, look in a local directory or computer publication. Your ISP should provide you with the following information:

- User name (also called user ID)
- Password
- Access number (the number you call to connect to the server)
- Host name and/or domain name
- Domain Name Server (DNS) server address

If, besides the Web, you use the Internet for e-mail and newsgroups, your ISP should also provide you with the following information:

- E-mail or POP mail address
- POP server address
- Mail or SMTP address
- News or NNT server address

Chapter 4 - AT Commands, S-Registers, and Result Codes

The AT Commands, S-Registers, and Result Codes for the MT5634ZBA-Series Modems are published is a separate Reference Guide. This guide is included on the MT5634ZBA-Series system CD. You can open the guide from the CD, or you download the guide to your hard drive.

Chapter 5 - Remote Configuration

Remote configuration is a network management tool that allows you to configure MT5634ZBA modems anywhere in your network from one location. With password-protected remote configuration, you can issue **AT** commands to a remote modem for maintenance or troubleshooting as if you were on site.

Basic Procedure

The following steps can be used when the connection is established by the **local** or the **remote** modem.

Note: The remote computer must be running and a communication program must be ready for a data connection, which will be indicated by a lighted **TR** indicator on the front of the modem.

1. Establish a data connection with a remote MT5634ZBA modem.
2. Send three remote configuration escape characters followed by **AT** and the setup password, and press ENTER. Example: **%%%ATMTSMODEM**. You have four tries to enter the correct password before being disconnected. If the password is correct, the remote modem responds with **OK.**
3. You can now send **AT** commands to configure the remote modem.
4. When you have finished configuring the remote modem, save the new configuration by typing **AT&W0** and pressing ENTER.
5. Type **ATO** and press ENTER to exit remote configuration. You can now break the connection in the normal way. **CAUTION:** If you hang up while you are in remote configuration mode, the modem may lock up.

Setup

Multi-Tech modems are shipped with a default setup password (MTSMODEM). Because anyone who has the *User Guide* knows the default setup password, you should change the password and possibly also the remote configuration escape character.

Changing the Setup Password

1. Open a data communications program such as HyperTerminal or PhoneTools.
2. In the terminal window, type **AT#SMTSMODEM** (or **AT#S***xxxxxxxx* if you have replaced the MTSMODEM password with *xxxxxxxx*) and press ENTER. The modem responds with *OK* if the setup password is correct, and *ERROR* if it is wrong.
3. To change the password, type **AT#S=***xxxxxxxx*, where *xxxxxxxx* stands for the password, and then press ENTER. The password can include any keyboard character, and can be up to eight characters long. The modem responds with *OK*. **CAUTION:** Passwords are case-sensitive. The next time you enter the password, it must be in the same case as you set it up.
4. The new password is saved automatically. You can now either enter more AT commands or exit the data communications program. The next time you wish to set up the modem, you must use the new password.

Changing the Remote Escape Character

To further improve security, you can change a remote modem's remote configuration escape character either locally or remotely. The remote configuration escape character is stored in register *S9*. The factory default is 37, which is the ASCII code for the percent character (%). Setting *S9* to 0 (zero) disables remote configuration entirely. **CAUTION:** If you do this remotely, you won't be able to change it back remotely.

1. Establish a remote configuration link with the remote modem as described in Basic Procedure.
2. Type **ATS9=***n*, where *n* is the ASCII code for the new remote configuration escape character, and then press ENTER.
3. Save the new value by typing **AT&W** and pressing ENTER.
4. Type **ATO** and press ENTER to exit remote configuration.

Chapter 6 - Callback Security

This chapter describes how to use callback security with your modem. Callback security protects your network from unauthorized access and helps control long-distance costs. When callback security is enabled, all callers are requested to enter a password. If a valid password is received, the modem hangs up and returns the call by dialing a phone number that is stored with the password. The person being called back must then enter the password a second time to establish a connection.

Up to 30 callback passwords and dialing strings can be stored in the modem. Each dialing string can be up to 34 or 35 characters long and can contain commands as well as phone numbers. For mobile callers, the dialing string can be programmed to allow the caller to bypass the stored callback number by entering a temporary callback number, to enter an extension at the callback number, or to make a direct connection without callback.

For local security, the passwords and dialing strings that are stored in the modem are protected from tampering by a setup password, which you should change when you set up the modem. You can further protect the modem against tampering by disabling its ability to respond to most AT commands. To check for attempted break-ins, you can request the modem to display the number of failed password attempts.

Your modem was shipped with a default setup password (MTSMODEM). The same password is used for both callback security and remote configuration (Chapter 5). Because anyone who has access to this guide has access to the default password, you should change the password during your initial setup.

Changing the Setup Password

1. Open a data communications program such as HyperTerminal or PhoneTools.
2. In the terminal window, type **AT#SMTSMODEM** (or **AT#S**_xxxxxxxx_ if you have replaced the MTSMODEM password with _xxxxxxxx_). Press ENTER. The modem responds with _OK_ if the setup password is correct and _ERROR_ if it is wrong.
3. To change the password, type **AT#S=**_xxxxxxxx_, where _xxxxxxxx_ stands for the password, and then press ENTER. The password can include any keyboard character, and can be up to eight characters long. The modem responds with _OK_.
4. The new password is saved automatically. You can now either enter more AT commands or exit the data communications program. The next time you wish to set up the modem, you must use the new password.

CAUTION: Passwords are case-sensitive. The next time you enter the password, it must be in the same case as you set it up.

Turning Callback Security On and Off

Callback security must be turned on to enter many callback security commands.

1. Open a data communications program such as HyperTerminal or PhoneTools.
2. In the terminal window, type **AT#S**_xxxxxxxx_, where _xxxxxxxx_ is your password. Press ENTER. The modem responds with _OK_ if the setup password is correct and _ERROR_ if it is wrong.
3. Type one of the following commands:
   - **To turn off callback security:** Type **AT#CBS0** and press ENTER. Callers no longer need a password to connect to the modem, the modem is unable to call them back, and the stored dialing command locations 0–3 become available.
   - **To turn on both local and remote callback security:** Type **AT#CBS1**. Press ENTER. With local security turned on, you must enter the setup password before you can enter any AT command except the **AT**, **ATI**_n_, and **AT#S**_xxxxxxxx_ commands. For a description of **remote** callback security, see the following paragraph.
   - **To turn on remote callback security only:** Type **AT#CBS2** and press ENTER. With remote callback security turned on, each caller is asked to enter a password, is called back, and then

is asked to enter the password again before a connection can be made. Also, dialing command locations 0–3 for use with the **DS=y** dialing command are replaced by callback dialing command locations 0–29.

- **To temporarily disable callback security if the modem is set to #CBS1 or #CBS2 (for instance, to call another modem):** Type **AT#CBS3** and press ENTER. The modem returns to its original setting when you issue the hangup command (**+++ATH**) or the modem is reset. Note that if a remote modem breaks the connection, callback security remains disabled.

Setting Callback Security Message Parity

The modem's password prompt and messages parity must match the parity of the computer to which the modem is connected.

1. Open a data communications program such as HyperTerminal or PhoneTools.
2. In the terminal window, type **AT#S*xxxxxxxx***, where *xxxxxxxx* is your password. Press ENTER. The modem responds with *OK* if the setup password is correct and *ERROR* if it is wrong.
3. The modem's parity default value is **No** parity (**AT#CBP0**). To change the modem's default to use even parity, type **AT#CBP2**. Press ENTER. For odd parity, type **AT#CBP1**. Press ENTER.
4. To store the new parity value, type **AT&W**. Press ENTER.

Assigning Callback Passwords and Phone Numbers

1. Open a data communications program such as HyperTerminal or PhoneTools.
2. In the terminal window, type **AT#S*xxxxxxxx***, where *xxxxxxxx* is your password. Press ENTER. The modem responds with *OK* if the setup password is correct and *ERROR* if it is wrong.
3. Enable callback security by typing **AT#CBS1** or **AT#CBS2** and pressing ENTER.
4. To store a callback password for the first callback memory location, type **AT#CBN0=*xxxxxxxx***, where *xxxxxxxx* is the first password. Press ENTER. The password must be unique, must be six to eight characters in length, and must not contain a **+** or **-** character.
5. To store a callback password for the second callback memory location, type **AT#CBN1=*xxxxxxxx***, where *xxxxxxxx* is the second password. Press ENTER. Note that the memory location number in the command is incremented by one.
6. Repeat as many times as necessary, up to memory location 29, until all passwords have been entered.
7. To store a callback phone number in the first memory location, type **AT&Z0=**[**+**][**-**]**AT*xxxxxxxx***[**,???**], where *xxxxxxxx* is the dialing string. Press ENTER. The phone number must be preceded by **DT** for tone dialing or **DP** for pulse dialing. The dialing string can also include other AT commands. Example: **AT&Z0=+-ATM0DT5551212**. Up to 35 characters can be used. The +, **-,** and **???** characters are optional:

   + Number entry. Enables a mobile caller to enter his current phone number for callback.

   - Direct connection. Enables a caller to choose direct connection without being called back.

   ,??? Extension entry. Must be used with the **+** command. Enables a caller to enter an extension number for callback. The number of **?** characters must equal the number of digits in the extension.
8. To store a callback phone number in the second memory location, type **AT&Z1=**[**+**][**-**]**AT*xxxxxxxx***[**,???**], where *xxxxxxxx* is the dialing string, and press ENTER. Note that the memory location number in the command is incremented by one.
9. Repeat as many times as necessary, through memory location 29, until all dialing strings have been entered.
10. To review your entries, type **AT&V** and press ENTER.

Note: A form is provided on the last page of this chapter to help you plan or keep track of password and phone number assignments.

Calling Procedures

Use the following procedures to call a modem that has callback security enabled. Note that Autoanswer must be enabled on the calling modem (**S0=1**).

Password-Only Callback

Use this procedure when calling from a fixed location.

1. Using a data communications program such as HyperTerminal or PhoneTools, dial the number of the callback modem.
2. When the connection is established, the callback modem responds with the following message:
   Password>
3. Type the password corresponding to the phone number for your modem. Press ENTER. You have three attempts or one minute to enter a valid password.
4. If the password is valid, the following message appears, and the modems disconnect:
   OK Disconnecting
5. After the delay specified by the **#CBD*n*** command, the callback modem calls the number associated with the password. If the callback modem is unable to establish a connection, it tries again, up to the number of attempts specified by the **#CBA*n*** command.
6. After the modems reconnect, the following message reappears:
   Password>
7. Type the same password that you used to initiate the call. You are allowed three attempts to enter the password, after which you will be disconnected.
8. If the password is valid, the following message appears and the modems establish a working connection:
   OK Connecting

Number-Entry Callback

Mobile callers should use this procedure when calling from a phone number different from that stored with the password. The password that is used must be set up for optional number-entry callback.

1. Using a data communications program such as HyperTerminal or PhoneTools, dial the number of the callback modem.
2. When the connection is established, the callback modem responds with the following message:
   Password>
3. Type a number-entry password, press the plus key (**+**), type **ATDT** and the number to call back to, and press ENTER. You have three attempts or one minute to enter a valid password.
   Note: When you type your phone number, be sure to include the long distance and area codes if they are needed.
4. If the password is valid, the following message appears, and the modems disconnect:
   OK Disconnecting
5. After the delay specified by the **#CBD*n*** command, the callback modem calls the number that you entered after the **+** character. If the callback modem is unable to establish a connection, it tries again, up to the number of attempts specified by the **#CBA*n*** command.
6. After the modems reconnect, the following message reappears:
   Password>
7. Type the same password that you used to initiate the call. You are allowed three attempts to enter the password, after which you will be disconnected.
8. If the password is valid, the following message appears and the modems establish a working connection:
   OK Connecting

Extension-Entry Callback

Use this procedure when calling from an extension at the callback number. The password that you use must be set up for an optional extension-entry callback.

1. Using a data communications program such as HyperTerminal or PhoneTools, dial the number of the callback modem.
2. When the connection is established, the callback modem responds with the following message:
   Password>
3. Type an extension-entry password, press the plus key (**+**), type the extension to call back to, and press ENTER. You have three attempts or one minute to enter a valid password.
4. If the password is valid, the following message appears, and the modems disconnect:
   OK Disconnecting
5. After the delay specified by the **#CBD***n* command, the callback modem calls the extension that you entered after the **+** character. If the callback modem is unable to establish a connection, it tries again, up to the number of attempts specified by the **#CBA***n* command.
6. After the modems reconnect, the following message reappears:
   Password>
7. Type the same password you used to initiate the call. You are allowed three attempts to enter the password. After that, you will be disconnected.
8. If the password is valid, the following message appears, and the modems establish a working connection:
   OK Connecting

Direct Connection

Use this procedure when you want to connect without first being called back. The password that you use must be set up for an optional direct connection.

1. Using a data communications program such as HyperTerminal or PhoneTools, dial the number of the callback modem.
2. When the connection is established, the callback modem responds with the following message:
   Password>
3. Type a direct connection password, press the - key, and then press ENTER. You have three attempts or one minute to enter a valid password.
4. If the password is valid, the following message appears and the modems establish a working connection:
   OK Connecting

Note: You can make all calls direct connect regardless of whether the password or phone number has the **-** character by using the **%H1** command

Callback Security Commands

The AT Commands related to Callback to Security are included in the separate AT Commands Reference guide included on MT5634ZBA-Series Modem system CD.

Callback Assignments Form

Location	Password	Telephone Number
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
34		
25		
26		
27		
28		
29		

Chapter 7 - Troubleshooting

Your modem was thoroughly tested at the factory before it was shipped. If you are unable to make a successful connection, or if you experience data loss or garbled characters during your connection, it is possible that the modem is defective. However, it is more likely that the source of your problem lies elsewhere. The following symptoms are typical of problems you might encounter:

- None of the LEDs light when the modem is on.
- The modem does not respond to commands.
- The modem cannot connect when dialing.
- The modem disconnects while online.
- The modem cannot connect when answering.
- File transfer is slower than it should be.
- Data is being lost.
- There are garbage characters on the monitor.
- The modem doesn't work with Caller ID.
- Fax and data software can't run at the same time.

If you experience problems, please check the following possibilities before calling Technical Support (see Appendix F).

None of the Indicators Light

When you turn on the modem, the LED indicators on the front panel should flash briefly as the modem runs a self-test. If the LEDs remain off, the modem is probably not receiving power.

- Make sure the modem's power switch is on, especially if you normally turn the modem on by turning on a power strip.
- If the modem is plugged into a power strip, make sure the power strip is plugged in and its power switch is on.
- Make sure the power supply is firmly connected to the modem and the power supply's power cord is firmly connected to both to the power supply and the wall outlet or power strip.
- If the power strip is on and the modem switch is on, try moving the power supply to another outlet on the power strip.
- Test that the outlet is live by plugging another device, such as a lamp, into it.
- The modem or power supply may be defective. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem or power supply might be defective. Call Technical Support for assistance.

CAUTION: Do not under any circumstances replace the power supply with one designed for another product; doing so can damage the modem and void your warranty.

The Modem Does Not Respond to Commands

- Make sure the modem is plugged in and turned on. (See "None of the Indicators Light.")
- Make sure you are issuing the modem commands from data communication software, either manually in terminal mode or automatically by configuring the software. (You cannot send commands to the modem from the DOS prompt.)
- Make sure you are in terminal mode in your data communication program, then type **AT** and press ENTER. If you get an *OK* response from your modem, your connections are good and the problem likely is in the connection setup in your communication software.

- Try resetting your modem by turning it off and on. If you are using DOS or Windows 3.1 communication software, make sure the initialization string includes **&F** as the first command, to cancel any "leftover' command that could affect the modem's operation.

- If you don't get an *OK*, the problem may still be in the communication software. Make sure you have done whatever is necessary in your software to make a port connection. Not all communication programs connect to the COM port automatically. Some connect when the software loads and remain connected until the program terminates. Others can disconnect without exiting the program. The modem's TR indicator lights to show that the software has taken control of the modem through the COM port.

- Your communication software settings may not match the physical port to which the modem is connected. The serial cable might be plugged into the wrong connector—check your computer docu-mentation to make sure. Or you might have selected a COM port in your software other than the one the modem is physically connected to—compare the settings in your software to the physical connection.

- If the modem is on, the cable is plugged into the correct port, the communication software is configured correctly, and you still don't get an *OK*, the fault might be in the serial cable. Make sure it is firmly connected at both ends.

- Is this the first time you have used the cable? If so, it may not be wired correctly. Check the cable description on the packaging to make sure the cable is the right one for your computer.

- Peripheral expansion cards, such as sound and game cards, might include a serial port preconfigured as COM1 or COM2. The extra serial port, or the card itself, may use the same COM port, memory address, or interrupt request (IRQ) as your communication port. Be sure to disable any unused ports.

  Windows 9x: Right-click on **My Computer**, select **Properties** from the menu, click on the **Device Manager** tab, double-click on **Ports**, then double-click on the communication port your modem is connected to. In the port's **Properties** sheet, click on the **Resources** tab to see the port's input/output range and interrupt request. If another device is using the same address range or IRQ, it appears in the **Conflicting Device List**. Uncheck **Use automatic settings** to change the port's settings so they do not conflict with the other device, or select the port the conflicting device is on and change it instead. If you need to open your computer to change switches or jumpers on the conflicting device, refer to the device's documentation.

  Windows NT 4.0: To look for address or IRQ conflicts, click Start, Programs, Administrative Tools (Common), and Windows NT Diagnostics. In the **Windows NT Diagnostics** dialog box, click the **Resources** tab to see which input/output ranges and interrupt requests are in use. If you need to open your computer to change switches or jumpers on the conflicting device, refer to the device's documentation.

- The serial port might be defective. If you have another serial port, install the modem on it, change the COM port setting in your software, and try again.

- The modem might have a problem beyond the scope of this user guide. If you have another Multi-Tech modem, try the other modem (if there is no problem with the other modem, call Technical Support for assistance. See Appendix F for phone numbers).

The Modem Cannot Connect When Dialing

There can be several reasons the modem fails to make a connection. Possibilities include
- lack of a physical connection to the telephone line.
- a wrong dial tone.
- a busy signal.
- a wrong number.
- no modem at the other end.
- a faulty modem, computer, or software at the other end.
- incompatibility between modems
- poor line conditions.

You can narrow the list of possibilities by using extended result codes. Extended result codes are enabled by default. If they have been disabled, include **V1X4** in the modem's initialization string, or in terminal mode enter **ATV1X4** and press ENTER. When you dial again, the modem reports the call's progress.

- If the modem reports *NO DIALTONE*, check that the modem's telephone line cable is connected to both the modem's LINE jack (not the PHONE jack) and the telephone wall jack. If the cable looks secure, try replacing it. If that doesn't work, the problem might be in your building's telephone installation. To test the building installation, plug a telephone into your modem's telephone wall jack and listen for a dial tone. If you hear a dial tone, your modem might be installed behind a corporate phone system (PBX) with an internal dial tone that sounds different from the normal dial tone. In that case, the modem might not recognize the dial tone and might treat it as an error. Check your PBX manual to see if you can change the internal dial tone. If you can't, change your modem's initialization string to replace **X4** with **X3**, which will cause the modem to ignore dial tones.
- If the modem reports BUSY, the other number might be busy, in which case you should try again later. However, it might indicate that you have failed to add a **9,** the prefix to the phone number if you must dial *9* for an outside line.

  If you must dial *9* to get an outside line, the easiest way to dial it automatically is to include it in the modem's dial prefix; e.g., **ATDT9**. Note the comma, which inserts a pause before the number is dialed. By inserting **9,** into the dial prefix, you do not have to include it in each directory entry.

  To change the dial prefix in Windows HyperTerminal, select **Connect** from the **Call** menu, click **Dialing Properties**, and type **9** in the local and long distance boxes in **How I dial from this location**.
- If the modem reports *NO ANSWER*, the other system has failed to go off-hook, or you might have dialed a wrong number. Check the number.
- If the modem reports *NO CARRIER*, the phone was answered at the other end, but no connection was made. You might have dialed a wrong number, and a person answered instead of a computer, or you might have dialed the correct number but the other computer or software was turned off or faulty. Check the number and try again, or try calling another system to make sure your modem is working. Also, try calling the number on your telephone. If you hear harsh sounds, then another modem is answering the call, and the modems might be having problems negotiating because of modem incompatibilities or line noise. Try connecting at a lower speed.
- Poor line conditions can affect the connection. When using V.34 or V.32 client-to-client connections in poor conditions, setting **S38=0** may result in better performance.

The Modem Disconnects While Online

- If you are not using Modem on Hold, Call Waiting can interrupt your connection when someone tries to call you. If you have Call Waiting service, disable it before each call. In most telephone areas in North America, you can disable Call Waiting by preceding the telephone number with ***70** (but first check with your local telephone company).

  You can automatically disable Call Waiting by including the disabling code in the modem's dial prefix (e.g., **ATDT*70,** – note the comma, which inserts a pause before the number is dialed). To change the dial prefix in Windows HyperTerminal, select **Connect** from the **Call** menu, click **Dialing Properties**, check **This location has Call Waiting**, and select the correct code for your phone service.

  If you have extension phones on the same line as your modem, you or someone else can interrupt the connection by picking up another phone. If this is a frequent problem, disconnect the extension phones before using the modem, or install another phone line especially for the modem.
- Check for loose connections between the modem and the computer, the telephone jack, and AC power.
- You might have had a poor connection because of line conditions or the problem might have originated on the other end of the line. Try again.
- Your ISP might have hung up on you because of lack of activity on your part or because you exceeded your time limit for the day. Try again.

Modem Cannot Connect When Answering

- The default DTR Control command (**&D2**) inhibits autoanswer. To enable autoanswer, change DTR Control to **&D0**, and make sure **&Q0**, **&Q5**, or **&Q6** is also set. For more information, see the **&D** command in the AT Commands Reference Guide. For information on changing the modem's default configuration, see "Install and Configure Your Software" in Chapter 2.
- Autoanswer might be disabled. Turn on autoanswer in your communications program or send the command **ATS0=1** (**ATS0=2** if you have Caller ID service) to your modem in terminal mode.

File Transfer Is Slower Than It Should Be

- If you are using a slow transfer protocol, such as Xmodem, try Zmodem or Ymodem/G instead.
- Is your line noisy? If there is static on your line, the modem has to resend many blocks of data to insure accuracy. You must have a clean line for maximum speed.
- Are you downloading a compressed file with MNP 5 hardware compression enabled? Since hardware data compression cannot compress a file already compressed by an archiving program, the transfer can be marginally slower with data compression enabled than with it disabled.
- Does your Internet service provider (ISP) use the same 56K protocol as your modem? The default setting of your modem is to connect using either the V.92 or the V.90 protocol, depending on which one the ISP's modem is using. If your ISP uses the V.90 protocol, the maximum speed you will be able to upload at is 33,600 bps. Check with your ISP to see which protocols it supports.
- Are you trying to send a file to another client modem? If so, then your maximum possible connect speed is 33,600 bps. You can upload at speeds up to 48,000 bps only when connected to an ISP that supports the V.92 protocol.
- Try entering the **I11** command in online mode or the **&V** command in command mode to display information about the last connection, making a screen print of the connection statistics, and checking for parameters that might be unacceptable.

Data Is Being Lost

- If you are using data compression and a high speed serial port, set the serial port baud rate to two to six times the data rate.
- Make sure the flow control method you selected in software matches the method selected in the modem.
- Try entering the **I11** command in online mode or the **&V** command in command mode to display information about the last connection, making a screen print of the connection statistics, and checking for parameters that might be unacceptable.

There Are Garbage Characters on the Monitor

- Your computer and the remote computer might be set to different word lengths, stop bits, or parities. If you have connected at 8-N-1, try changing to 7-E-1, or vice-versa, using your communication software.
- You might be experiencing line noise. Enable error correction, if it is disabled, or hang up and call again; you might get a better connection the second time.
- At speeds above 2400 bps, the remote modem might not use the same transmission or error correction standards as your modem. Try connecting at a slower speed or disabling error correction. (With no error correction, however, line noise can cause garbage characters.)
- Try entering the **I11** command in online mode or the **&V** command in command mode to display information about the last connection, making a screen print of the connection statistics, and checking for parameters that might be unacceptable.

The Modem Doesn't Work with Caller ID

- Caller ID information is transmitted between the first and second rings, so if autoanswer is turned off (**S0=0**) or if the modem is set to answer after only one ring (**S0=1**), the modem will not receive Caller ID information. Check your initialization string, and if necessary change it to set the modem to answer after the second ring (**S0=2**).

- Make sure that you have Caller ID service from your telephone company.

Fax and Data Software Can't Run at the Same Time

- Communication devices can be accessed by only one application at a time. Under DOS or Windows 3.1x, you can run either your fax software or your data communications software, but not both at the same time, unless you have a special communication device management application. In Windows 95 and higher, you can have data and fax communication applications open at the same time, but they cannot use the same modem at the same time.

Appendix A - Technical Specifications

The MT5634ZBA-Series modem meets the following specifications:

Trade Name MultiModemZBA™

Model Number MT5634ZBA

Build Number Global MT5634ZBA–V90, Global MT5634ZBA-V–V90, Global MT5634ZBA–V92, Global MT5634ZBA-V–V92

Server-to-Client Data Rates 56K speeds when accessing a V.90 or V.92 server (actual speed depends on server capabilities and line conditions)*

Client-to-Server Data Rates Up to 48Kbps when accessing a V.92 server (actual speed depends on server capabilities and line conditions); otherwise the same as client-to-client data rates (see next listing).

Client-to-Client Data Rates 33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800 bps, 4400, 12000, 9600, 7200, 4800, 2400, 1200, 0-300 bps

Fax Data Rates *V.92:* 33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800
V.92 & V.90: 14400, 12000, 9600, 7200, 4800, 2400, 300 bps

Voice Compatibility TIA/EIA IS-101 (Voice Option only)

Data Format Serial, binary, asynchronous

Modem Compatibility ITU-T V.92, V.90, V.34 enhanced, V.34, V.32bis, V.32, V.22bis, V.22; Bell 212A and 103/113; ITU-T V.21 & V.23; V.42, V.42bis, V.44.

Fax Compatibility **V.92:** ITU-T "Super" Group 3; Class 1.0, 2.0, 2.1; T.4; T.30; V.21; V.27ter; V.29; V.34; V.17; and TIA/EIA Class 1, 2; TR29.2
V.90: ITU-T Group 3, Class 1 and 2, T.4, T.30, V.21, V.27ter, V.29, V.17, and TIA/EIA TR29.2

Video Compatibility ITU-T V.80 for H.324 video conferencing

Error Correction ITU-T V.42

Data Compression **V.92:** ITU-T V.44 (6:1 throughput)
V.92 and V.90: V.42bis (4:1 throughput), MNP 5 (2:1 throughput)

Speed Conversion Serial port data rates adjustable to 300, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, 115,200, and 230,400 bps

Mode of Operation Fax online modes; full duplex over dial-up lines

Flow Control XON/XOFF (software), RTS/CTS (hardware)

Intelligent Features Plug and play; fully AT command compatible; dialing options, autoanswer; adaptive answer; EIA extended automode; adaptive line probing; automatic symbol and carrier frequency during start-up, retrain, and rate renegotiation; DTMF detection; call status display, auto-parity and data rate selections; keyboard-controlled modem options; non-volatile memory; remote configuration; DTR dialing; callback security; A-law support in 56K modes; 11-bit support; real-time fax compression conversion; U.S. Caller ID reporting; quick-connect startup (V.92); Modem-on-Hold (V.92).

Command Buffer 40 characters

Transmit Level	-11 dBm (North America) – varies by country setting
Frequency Stability	±0.01%
Receiver Sensitivity	-43 dBm under worst-case conditions
AGC Dynamic Range	43 dB
Interface	TIA/EIA RS-232C/ITU-T V.24/V.28
Connectors	DB25F RS-232C connector; 2 RJ-11 telephone jacks; power jack
Cables	Country-specific telephone; power cables; serial cable **Note:** Any cables connected to the computer should be shielded to reduce interference.
Diagnostics	Power-on self test, local analog loop, local digital loop, remote digital loop.
Indicators	LEDs for Transmit Data, Receive Data, Carrier Detect, 56K bps, 33.6K bps, 14.4K bps, Off Hook, Terminal Ready, Error Correction, Fax.
Speaker	Internal speaker for call progress monitoring.
Manual Control	Power switch
Environmental	Temperature range 0°–50°C (32°–120°F) ambient under closed conditions; humidity range 20–90% (non-condensing)
Power Requirements	100–130/230VAC, 50/60 Hz, 5 W; two-prong outlet-mounted transformer (included); 230V/50 Hz optional (international); universal power supply
Power Consumption	9 VDC, 300 mA maximum
Dimensions	10.8 cm wide x 14.8 cm long x 2.9 cm high (4.25″ x 5.8″ x 1.15″)
Weight	224 g (8 oz)
Limited Warranty	10 years

Appendix B - Upgrading the Modem's Firmware

Your modem is controlled by semi-permanent software, called *firmware*, which is stored in flash memory. Firmware is nonvolatile; that is, it remains stored in memory when the modem is turned off. However, it can be changed by either the manufacturer or the user as bugs are fixed or new features are added.

Since the firmware in your modem is stored in flash memory, you can upgrade it yourself in a few minutes by using the following procedures.

Upgrade Overview

The upgrade procedure consists of the following steps, which are described in greater detail in the following sections.

1. Identify the model number and firmware version of your modem.
2. Identify the current version of the firmware at the Multi-Tech Web site or BBS. If your modem already has the current firmware, there is no need to update it.
3. Download the upgrade file and the appropriate Flash Wizard for your modem.
4. Install the Flash Wizard and extract the firmware .HEX file from the file you downloaded.
5. Document and clear your stored parameters.
6. Upgrade the modem's firmware using the .HEX file and the Flash Wizard.
7. Restore your parameters.

Step 1: Identify the Modem Firmware

You must know the model number and firmware version of your Multi-Tech modem to know whether or not you should update it.

1. Run your favorite terminal program. If you are using Windows 95 or above, you can use Windows HyperTerminal.
2. In the program's terminal window, type **AT&F**. Even if you cannot see the **AT&F** command on your screen, be sure to type it completely, and then press ENTER. If the modem does not respond with *OK*, repeat the **AT&F** command.
3. Now type **ATI**, press ENTER, and record your results. The model number and firmware version should appear similar to that shown below.
   ```
   LT V.92 1.0 MT5634ZBA-V-V92 Serial Voice/Data/Fax Modem Version 1.25k
   ```

Step 2: Identify the Current Firmware Version

Identify the current version of the firmware at the Multi-Tech Web site. If your modem already has the current firmware, there is no need to update it.

1. Using your favorite Web browser, go to http://www.multitech.com/SUPPORT/MultiModemZBA/firmware.asp.
2. Scroll down to your modem model number.
3. Look at the firmware version number for your modem.
4. If the firmware version number matches the firmware version number found in "Step 1: Identify the Modem Firmware," you have the current firmware version and do not need to be update.
5. If the firmware version number is greater than the firmware version number found in "Step 1: Identify the Modem Firmware," your modem has an older firmware version. Continue with "Step 3: Download the Upgrade File."

Warning: The first digit of the new firmware must match the first digit of the old firmware, or the modem may not work properly. E.g., if your current firmware version is 4.16, replace it only with 4.xx firmware, not 6.xx firmware.

Step 3: Download the Upgrade File

1. If you are not already at the MultiModemZBA Firmware page of the Multi-Tech Web site, follow the procedure in "Step 2: Identify the Current Firmware."
2. Download the upgrade file for your modem by clicking its name, and save the file in a temporary folder on your hard disk.
3. In the same section of the Web page, click the Flash Wizard utility for your operating system to download it, and save it in the same folder.

Step 4: Extract the Upgrade Files

1. Install the Flash Wizard utility by double-clicking the file name in Windows Explorer.
2. Extract the upgrade files by double-clicking the file name. The extracted files include a .HEX file, which contains the upgrade data, and a Readme file.
3. Copy the upgrade .HEX file into the Flash Wizard folder, which, in a default installation, is at C:\Program Files\MultiTech Systems\Flash Wizard\.

Step 5: Clear Your Stored Parameters

Before you flash your modem, you should record the parameters that are currently stored in it, so you can reprogram it after flashing. After you have recorded them, send the **AT&W1Z** command to the modem to clear the stored parameters.

1. Run your favorite terminal program. If you are using Windows 95 or above, you can use Windows HyperTerminal.
2. In the program's terminal window, type **AT&V** and press ENTER to list your modem's current parameters.
3. Record your parameters by saving the screens and sending them to your printer.
4. Type **AT&W1Z** and press ENTER to clear your stored parameters and reset your modem to factory default.
5. Close the terminal program.

Step 6: Upgrade the Modem's Firmware

Before you begin the following procedure, read the README.TXT file extracted from the upgrade archive file. Note the file name for the new firmware (example: ARQG125A.HEX).

WARNING: Never install an older version of firmware over a newer version. Doing this WILL DESTROY THE FLASH PROM! If the flash PROM is destroyed, the modem must be sent in for repair.

1. Run Flash Wizard by double-clicking its icon or file name, or by selecting it from the Start menu. The **Identifying Devices** dialog box is displayed as Flash Wizard locates and identifies the devices connected to your system.
   Note: If the message *ERROR: No valid devices detected* is displayed, verify that the modem is turned on and that all cables are correctly and securely attached.
2. Click the modem to be upgraded, and then click **Next** to proceed.
3. Select the port to be upgraded from the **Port** list, select the appropriate .HEX file from the **Hex File** list, and then click **Next** to continue.
   Note: Do not use FLASHLDR.HEX. This file is used internally by Flash Wizard.
4. The **Progress** dialog box appears, showing a status bar that indicates the progress of the upgrade.
   Caution: Any disruption of the program during this stage of the upgrade can cause your modem to become inoperable. Wait for the **Next** button to become active before proceeding.
5. When the flash upgrade is complete, the message *Programming Complete* appears. Click **Next** to continue.
6. The **Results** dialog box appears next. Click **Finish** to exit Flash Wizard.

Step 7: Restore Your Parameters

Your modem has been updated. You can now open your terminal program to reprogram your modem parameters or to confirm the update by typing **ATI** in the terminal window and pressing ENTER.

Appendix C - Regulatory Compliance

FCC Part 15 Regulation

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC rules. Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.

> **WARNING** – Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

FCC Part 68 Telecom

1. This equipment complies with Part 68 of the Federal Communications Commission Rules. On the outside surface of this equipment is a label that contains, among other information, the FCC registration number. This information must be provided to the telephone company.

2. The suitable USOC jack (Universal Service Order Code connecting arrangement) for this equipment is shown below. If applicable, the facility interface codes (FIC) and service order codes (SOC) are shown.

3. An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack that is Part 68 compliant.

4. The ringer equivalence number (REN) is used to determine the number of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in the device not ringing in response to an incoming call. In most, but not all, areas the sum of the RENs should not exceed 5.0. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company.

5. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

6. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications in order to maintain uninterrupted service.

7. If trouble is experienced with this equipment (the model of which is indicated below) please contact Multi-Tech Systems, Inc. at the address shown below for details of how to have repairs made. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.

8. No repairs are to be made by you. Repairs are to be made only by Multi-Tech Systems or its licensees. Unauthorized repairs void registration and warranty.

9. This equipment should not be used on party lines or coin lines.

10. If so required, this equipment is hearing aid compatible.

11. Manufacturer: Multi-Tech Systems, Inc.
    Trade Name: MultiModemZBA
    Model Number: MT5634ZBA
    FCC Registration No: AU7USA-24713-M5-E
    Ringer Equivalence: 0.3B
    Modular Jack (USOC):   RJ11C or RJ11W (single line)

    Service Center in USA: Multi-Tech Systems, Inc.
    2205 Woodale Drive:
    Mounds View, MN 55112
    U.S.A.
    (763) 785-3500
    (763) 785-9874 Fax

Fax Branding Statement

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains the following information:

- Date and time the message is sent
- Identification of the business or other entity, or other individual sending the message
- Telephone number of the sending machine or such business, other entity, or individual

This information is to appear in a margin at the top or bottom of each transmitted page or on the first page of the transmission. (Adding this information in the margin is referred to as *fax branding*.)
Since any number of fax software packages can be used with this product, the user must refer to the fax software manual for setup details. Typically the fax branding information must be entered via the configuration menu of the software.

Canadian Limitations Notice

Notice: The ringer equivalence number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the ringer equivalence numbers of all the devices does not exceed 5.

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

International Modem Restrictions

Some dialing and answering defaults and restrictions may vary for international modems. Changing settings may cause a modem to become non-compliant with national telecom requirements in specific countries. Also note that some software packages may have features or lack restrictions that may cause the modem to become non-compliant.

C E

EMC, Safety and R&TTE Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility.

and

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits:

and

Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

New Zealand Telecom Warning Notice

1. The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

   This equipment is not capable under all operating conditions of correct operation at the higher speed which it is designated. 33.6 kbps and 56 kbps connections are likely to be restricted to lower bit rates when connected to some PSTN implementations. Telecom will accept no responsibility should difficulties arise in such circumstances.

2. Immediately disconnect this equipment should it become physically damaged, and arrange for its disposal or repair.

3. This modem shall not be used in any manner, which could constitute a nuisance to other Telecom customers.

4. This device is equipped with pulse dialing, while the Telecom standard is DTMF tone dialing. There is no guarantee that Telecom lines will always continue to support pulse dialing.

   Use of pulse dialing, when this equipment is connected to the same line as other equipment, may give rise to 'bell tinkle' or noise and may also cause a false answer condition. Should such problems occur, the user should not contact the Telecom Faults Service.

   The preferred method of dialing is to use DTMF tones, as this is faster than pulse (decadic) dialing and is readily available on almost all New Zealand telephone exchanges.

11. Warning Notice: No '111' or other calls can be made from this device during a mains power failure.

12. This equipment may not provide for the effective hand-over of a call to another device connected to the same line.

13. Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PC) associated with this device. The associated equipment shall be set to operate within the following limits for compliance with Telecom's Specifications:

    For repeat calls to the same number:
    - There shall be no more than 10 call attempts to the same number within any 30-minute period for any single manual call initiation, and
    - The equipment shall go on-hook for a period of not less than 30 seconds between the end of one attempt and the beginning of the next attempt.

    For automatic calls to different numbers:
    - The equipment shall be set to ensure that automatic calls to different numbers are spaced such that there is no less than 5 seconds between the end of one call attempt and the beginning of another.

    For automatically answered incoming calls:
    - The equipment shall be set to ensure that calls are answered between 3 and 30 seconds of receipt of ringing.

14. For correct operation, total of the RN's of all devices connected to a single line at any time should not exceed 5.

South African Statement

This modem must be used in conjunction with an approved surge protection device.

Appendix D - Installing a Modem Under Linux

This appendix explains how to install a modem on a computer operating under the Red Hat Linux 6.2 operating system. Other versions of Red Hat and other Linux operating systems should be similar. Briefly, in Linux, you do not need drivers for most standard external modems and most internal ISA bus modems. Programs in Linux commonly call upon the port, rather than the modem.

Standard Linux Serial Port Definitions

PC port	Linux port
Com1	ttyS0
Com2	ttyS1
Com3	ttyS2
Com4	ttyS3

Installation

Connect the external modem to an available serial port.

Setup

This section describes how to make sure Linux can talk to the modem and be able to dial up the Internet. Linux can use different programs and desktops depending on who made the Linux operating system and what version it is. The following procedures use the most commonly installed components of Red Hat 6.2. More information can be found in your Linux OS owner's manual.

Using the Terminal Program Minicom to Verify Operation

1. At the command prompt, type **minicom –s** and press ENTER.
2. Select **Serial port setup** and press ENTER.
3. From **Serial port setup**, use the A key to access **Serial Device**, and then press ENTER.
4. Press ESC.
5. You are now in the Minicom terminal. Type **AT** and press ENTER. The screen should display *OK* to verify the operation. Alternately, dial a phone number to verify line operation
6. To leave Minicom, press CTRL + A, and then press Z.
7. On the help menu, press X to exit.

Using the Modem to Call the Internet

Linux allows different graphic user interfaces (GUI). In the following steps, we'll use the Gnome Desktop GUI and assume that your Internet Service Provider (ISP) assigns the Domain Name Service (DNS) and Internet Protocol (IP) addresses.

1. On the Task Bar at the bottom of the screen, select the Gnome Footprint.
2. Select **Internet** from the menu.
3. Select **Dialup Configuration Tool**.
4. Select **Add**, and then click **Next**.
5. Enter the connection name and phone number, and then click **Next**.
6. Enter your user name and password, and then click **Next**.
7. Select **Normal ISP** if your ISP is not listed, and then click **Next**.
8. Click **Finish**.

Calling the ISP

1. On the Task Bar at the bottom of the screen, select the Gnome Footprint.
2. Select **Internet** from the menu.
3. Select **RH PPP Dialer**.
4. Select the connection name you entered in step 5 of the previous section.
5. Click **OK**.

Answering Calls

To use the system for answering calls, Linux requires other programs to be installed, such as Mgetty, Mgetty+Sendfax, and others, depending on your requirements. Each vendor of Linux has more than adequate information on installing these programs.

Appendix E - Connecting to a Cisco Router

Connecting to a Cisco Router Console Port

The console port on the Cisco IOS® router is an asynchronous serial port configured as data communications equipment (DCE). For Cisco 1000, 1600, 2500, 2600, and 3600 series routers, the console port uses an RJ-45 connector.

WARNING: Do not connect the modem to the Cisco router's auxiliary port. This procedure and document apply only to the Cisco router's console port.

Step 1: Configure the Modem for your Country
Configure the modem defaults to match the requirements of the country in which it will be used. For information on how to do this, see "Step 5: Configure the Modem for your Country" in Chapter 2.

Step 2: Configure for Callback Security in Direct Connect Mode
Callback security requires a caller to give a correct password before sending data to the system. If you do not plan to use this feature, skip to Step 3. **Note:** Setting the modem for callback security in direct connect mode disables the remote configuration feature of the modem.

To Turn Direct Connect Callback Security On and Off
Callback security must be turned on to enter many callback security commands.
1. Using a terminal program such as HyperTerminal, type the command **AT#S*xxxxxxxx***, where *xxxxxxxx* is your password (1 to 8 characters long). Press ENTER. The modem responds with *OK* if the setup password is correct and *ERROR* if it is wrong. The default password is **MTSMODEM**. If you wish to change the password, then type the command **AT#S=*xxxxxxxx***, where *xxxxxxxx* is the new password (1 to 8 characters long), and press ENTER.
2. Type one of the following commands:
   - To turn on remote callback security only, type **AT#CBS2** and press ENTER.
   - To turn on both local and remote callback security, type **AT#CBS1** and press ENTER. When local security is turned on, you must enter the setup password before you can enter any AT command from a local terminal except the **AT**, **ATI*n***, and **AT#S*xxxxxxxx*** commands.
3. Type **AT&W0** to store the above commands to nonvolatile memory.

To Set the Parity of the Callback Security Messages
The modem's password prompt and messages parity must match the parity of the computer to which the modem is connected.
1. The default parity setting for your modem is no parity (**AT#CBP0**). To change the modem's prompt messages to use even parity, type **AT#CBP2** and press ENTER. For odd parity, type **AT#CBP1** and press ENTER.
2. To store the new parity value, type **AT&W** and press ENTER.

To Assign Callback Passwords
1. To store a callback password for the first callback memory location, type **AT#CBN0=*xxxxxxxx***, where *xxxxxxxx* is the first password. Press ENTER. The password must be unique, must be 6 to 10 characters in length, and must not contain a **+** or **-** character.
2. To store a callback password for the second callback memory location, type **AT#CBN1=*xxxxxxxx***, where *xxxxxxxx* is the second password, and press ENTER. Note that the memory location number in the command is incremented by one.
3. Repeat as many times as necessary until all passwords have been entered.
4. To review your entries, type **AT&V** and press ENTER.
5. To set the modem for direct connect mode, type **AT%H1** and press ENTER.

To Call a Modem Configured for Callback Security
1. Using a terminal program and an originating modem, dial the number of the modem connected to the Cisco router, which we will call the "remote modem."
2. When connection is established, the remote modem responds: *Password>*

3. Type a direct connection password, and press ENTER. You have three attempts or one minute to enter a valid password.
4. If the password is valid, the message *OK Connecting* appears and the modems establish a working connection.

Step 3: Console Port Final Setup

Send the following command string to the modem connected to the console port of the Cisco router:
AT%R1&W0
The **%R1** command sets **E0**, **Q1**, **&D0**, **&K0**, **$SB9600**, and **%S1**, and the **&W0** command stores the commands to memory. The **%R1** command sets the following functions:

E0	Turns command echo off
Q1	Turns result codes off
&D0	Ignores DTR from the DTE
&K0	Selects no flow control
$SB9600	Sets the serial baud rate to 9600 bps.
%S1	Disables command mode at all serial speeds except 115200 bps.

The modem is now configured for use on the Cisco router console port. Note that command echo and result codes have been turned off. If it becomes necessary to send additional AT commands to the modem after it has been so configured, there will be little feedback from the modem that it has received and acted upon the command. Only commands such as **ATI0** that request specific data from the modem will send any data to the DTE as an indication that the modem has accepted the command. Temporarily turning on command echo and result codes might ease reconfiguration of the modem. When the modem is connected to the console port, turn the modem off and then on again. This will set the serial baud rate to 9600 bps as the **$SB9600** command is implemented.

Console Port Connections

To connect a personal computer to the console port, use the RJ-45-to-RJ-45 roll-over cable and either the RJ-45-to-DB-25 female DTE adapter or the RJ-45-to-DB-9 female DTE adapter (labeled "TERMINAL").

Cable Pin-outs and Cabling Guide

Console (DTE) signal	Console port RJ-45 pin	Console cable RJ-45 pin	Adapter DB-9 pin	Adapter DB-25 pin	Modem (DCE) signal
RTS	1	8	8	4	RTS
DTR	2	7	6	20	DTR
XMT	3	6	2	2	XMT
GND	4	5	5	7	GND
GND	5	4	5	7	GND
RCV	6	3	3	3	RCV
DSR	7	2	4	6	DSR
CTS	8	1	7	5	CTS

Remote Configuration

The configuration of the modem described in Step 3 contains the core settings that allow the modem to function properly on the console port of the Cisco router. Commands in this section may be done remotely by calling into the MT5634ZBA attached to the console port with another modem.

Note: Setting country configuration and turning on callback security cannot be done remotely. Nor can all commands be executed remotely if the remote modem is set for callback security; remote configuration of a modem so configured is not recommended.

1. Establish a data connection with a remote MT5634ZBA modem.
2. Send three remote configuration escape characters followed by **AT** and the setup password, and then press ENTER. Example: **%%%ATMTSMODEM**. You have four tries to enter the correct password before being disconnected. If the password is correct, the remote modem may respond with **OK**. **Note:** If the modem has previously been configured with command echo off and result codes off, it may be difficult to determine if the remote modem is responding to commands. The **ATI** command can be used for this purpose. Even with echo and result codes off, the modem will respond with the requested ID string if it is properly receiving the command.
3. You can now send AT commands to configure the remote modem.
4. When you have finished configuring the remote modem, save the new configuration by typing **AT&W0**<**CR**>, then type **ATO**<**CR**> to exit remote configuration. You can then break the connection in the normal way. **Note:** This step is important to ensure that the connection is broken cleanly.

Appendix F - Warranty, Service, and Technical Support

Warranty

Multi-Tech Systems, Inc., (hereafter "MTS") warrants that its products will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from date of purchase, or if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by Customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products which prove to be defective within the warranty period or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory – transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PRICE FOR DEFECTIVE PRODUCTS.

Repair Procedures for U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota factory:

        Multi-Tech Systems, Inc.
        2205 Woodale Drive
        Mounds View, MN 55112
        Attn: Repairs, Serial # _____

A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS.

Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check or purchase order for repair charges.

For out of warranty repair charges, go to www.multitech.com/documents/warranties

Extended two-year overnight replacement service agreements are available for selected products. Please call MTS at (888) 288-5470, extension 5308 or visit our web site at

http://www.multitech.com/programs/orc/ for details on rates and coverage's.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at (800) 972-2439 or email tsupport@multitech.com. Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631, or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Customers (Outside U.S.A. and Canada)

Your original point of purchase Reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the nearest distributor or other repair service for your Multi-Tech product.

http://www.multitech.com/COMPANY/offices/DEFAULT.ASP

In the event that factory service is required, products may be shipped, freight prepaid to our Mounds View, Minnesota factory.   Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. A Returned Materials Authorization (RMA) is required for products shipped from outside the U.S.A. and Canada. Please contact us for return authorization and shipping instructions on any International shipments to the U.S.A. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check drawn on a U.S. bank or your company's purchase order for repair charges. Repaired units shall be shipped freight collect, unless other arrangements are made in advance.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you or email tsupport@multitech.com. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at

+(763) 717-5631 in the U.S.A., or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Distributors

Procedures for International Distributors of Multi-Tech products are on the distributor web site.
http://www.multitech.com/PARTNERS/login/
Copyright © Multi-Tech Systems, Inc. 2001
10-Sep-01

Online Warranty Registration

If you have access to the Internet, you can register your Multi-Tech product online at
http://www.multitech.com/register/.

Service

U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota, factory:
Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112
Attn: Repairs, Serial #_____
A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS. Please include inside the shipping box a description of the problem, a return shipping address (must have street address, not P.O. Box), a telephone number, and if the product is out of warranty, a check or purchase order for repair charges.
For out of warranty repair charges, go to *http://www.multitech.com/documents/warranties.*
Extended two-year overnight replacement agreements are available for selected products. Please call MTS at 888 288-5470, extension 5308, or visit our web site at
http://www.multitech.com/PROGRAMS/orc/ for details on rates and coverages.
Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at 800 972-2439 or e-mail
tsupport@multitech.com.
Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at 800 328-9717 or +763 785-3500, or e-mail *mtsrepair@multitech.com*.
Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

International Customers (outside U.S.A. and Canada)

Your original point of purchase reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the nearest distributor or other repair service for your Multi-Tech product:
http://www.multitech.com/COMPANY/offices/DEFAULT.ASP.

In the event that factory service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota, factory. Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. A Returned Materials Authorization (RMA) is required for products shipped from outside the U.S.A. and Canada. Please contact us for return authorization and shipping instructions on any international shipments to the U.S.A. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a check drawn on a U.S. bank or your company's purchase order for repair charges. Repaired units will be shipped freight collect, unless other arrangements are made in advance. Please direct questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you, as listed at *http://www.multitech.com/COMPANY/offices/DEFAULT.ASP.*, or e-mail *tsupport@multitech.com*. When calling the U.S., please direct questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +763 717-5631 in the U.S.A., or e-mail *mtsrepair@multitech.com*.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

International Distributors

Procedures for international distributors of Multi-Tech products are on the Distributor Web site at *http://www.multitech.com/PARTNERS/login/*.

Replacement Parts

SupplyNet, Inc., can supply you with replacement power supplies, cables and connectors for selected Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at the following addresses:

Mail: SupplyNet, Inc.
                 614 Corporate Way
                 Valley Cottage, NY 10989
Phone: 800 826-0279
Fax: 914 267-2420
Email: *info@thesupplynet.com*
Internet: http://www.thesupplynet.com

Technical Support

Multi-Tech Systems has an excellent staff of technical support personnel available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this unit, please call 800 972-2439 (USA and Canada) or 763 785-3500 (international and local). Please have modem information available. You can also contact Technical Support by email at the following addresses:

Country	Email	Telephone
France:	*support@multitech.fr*	+(33) 1-64 61 09 81
India:	*support@multitechindia.com*	+91 (124) 6340778
U.K.:	*support@multitech.co.uk*	+(44) 118 959 7774
U.S.A., Canada	*support@multitech.com*	800 972-2439
Rest of world:	*support@multitech.com*	+763 717-5863

Please note the status of the modem before contacting Technical Support. Status information can include the state of the LED indicators, screen messages, diagnostic test results, problems with a specific application, etc.

Internet Sites

Multi-Tech is a commercial provider on the Internet. Multi-Tech has a Web site at
http://www.multitech.com
and an ftp site at *ftp://ftp.multitech.com*

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